

lapped portion of said first metal member; and

stirring a joining portion of said first metal member in a rotation direction of said rotor by the use of friction caused by the rotating motion of said rotor while maintaining the joining portion in non-molten state, to form a non-molten stirred layer and expanding the non-molten stirred layer to said second metal member, and stirring said first and second metal members in the rotation direction of said rotor and in a direction of a thickness of the metal members in the concave portion, by rotation and pressure of said rotor.

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2. (ONCE AMENDED) The method of processing metal members according to claim 1, wherein uneven portions differing in height in the circumferential direction are formed on the tip portion of said rotor.

3. (UNAMENDED) The method of processing metal members according to claim 1, wherein a receiving member is provided in such a manner as to face the tip portion of said rotor via the first and second metal members and a concave portion is formed in the tip portion of said receiving member.

4. (UNAMENDED) The method of processing metal members according to claim 1, wherein another rotor is provided in such a manner as to face the tip portion of said rotor via the first and second metal members, said two rotors being rotated in the opposite direction with the first and second metal members interposed between them.

5. (UNAMENDED) The method of processing metal members according to claim 1, wherein the first and second metal members are continuously joined by moving said rotor.

A² 6. (ONCE AMENDED) The method of processing metal members according to claim 1, wherein the first metal member has a first side having a first thickness and a second side having a second thickness, thinner than the first thickness, and the tip portion of said rotor is pressed from the second side.

7. (UNAMENDED) The method of processing metal members according to claim 1, wherein said first and second metal members are joined by allowing an alloy material, which can mutually diffuse with said first and second metal members, to intervene between said first and second metal members at the portion to be joined;

pressing and rotating said rotor against the portion of said first and second metal members to be joined, and stirring the same portion by the use of friction caused by the rotating motion of said rotor while keeping the same in a non-molten state, so as to form a non-molten stirred layer; and

expanding the non-molten stirred layer to said second metal member.

8. (UNAMENDED) The method of processing metal members according to claim 1, wherein said first and second metal members are joined while removing burrs produced on said first metal member in the vicinity of said rotor due to the rotating and pressing motion of said rotor.

A³ 9. (ONCE AMENDED) A method of processing a metal member, comprising:
reforming a surface of said metal member comprising pressing a planar tip of a rotor, which is rotating around a central axis thereof and has a concave portion formed substantially at a center of said planar tip, along the axis and against said metal member; and

stirring said metal member in a rotation direction of said rotor and in a direction of a thickness of the metal member in the concave portion by rotation and pressure of said rotor.